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# NBS SPECIAL PUBLICATION **260-57**

U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

*Standard Reference Materials:*

**GUIDE TO UNITED STATES  
REFERENCE MATERIALS**

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# *Standard Reference Materials:*

## **GUIDE TO UNITED STATES REFERENCE MATERIALS**

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\* Special Publication

J. Paul Cali

Office of Standard Reference Materials  
Institute for Materials Research  
National Bureau of Standards  
Washington, D.C. 20234

and

Tomasz Plebanski

Polish Committee of Standardization  
and Measures  
Warsaw, Poland



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U.S. DEPARTMENT OF COMMERCE, Juanita M. Kreps, Secretary

Dr. Sidney Harman, Under Secretary

Jordan J. Baruch, Assistant Secretary for Science and Technology

U.S. NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Acting Director

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This 260 Series is dedicated to the dissemination of information on all phases of the preparation, measurement, and certification of NBS-SRM's. In general, much more detail will be found in these papers than is generally allowed, or desirable, in scientific journal articles. This enables the user to assess the validity and accuracy of the measurement processes employed, to judge the statistical analysis, and to learn details of techniques and methods utilized for work entailing the greatest care and accuracy. It is also hoped that these papers will provide sufficient additional information not found on the certificate so that new applications in diverse fields not foreseen at the time the SRM was originally issued will be sought and found.

Inquiries concerning the technical content of this paper should be directed to the author(s). Other questions concerned with the availability, delivery, price, and so forth will receive prompt attention from:

Office of Standard Reference Materials  
National Bureau of Standards  
Washington, D.C. 20234

J. Paul Cali, Chief  
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## OTHER NBS PUBLICATIONS IN THIS SERIES

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- Cali, J. P. and Plebanski, T., Guide to United States Reference Materials, NBS Spec. Publ. 260-57 (in press).
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Standard Reference Materials:  
GUIDE TO UNITED STATES REFERENCE MATERIALS

J. Paul Cali

Office of Standard Reference Materials  
Institute for Materials Research  
National Bureau of Standards  
Washington, D.C. 20234

and

Tomasz Plebanski

Polish Committee of Standardization  
and Measures  
Warsaw, Poland

Summarized is a list of reference materials produced and distributed by U.S. manufacturers, both public and private. Extensive tables are indexed by use to which reference materials may be put. Properties covered include: chemical composition (analytical chemical purposes), chemical composition (high purity), physical properties, engineering and technological properties, and biochemical properties. Names and addresses of 93 U.S. producers and/or distributors are included.

Key words: Measurement; reference materials; standardization; Standard Reference Materials.

# GUIDE TO UNITED STATES REFERENCE MATERIALS

## I. Background

In 1976, the Council Committee on Reference Materials (REMC0) of the International Organization for Standardization proposed as the term "reference materials" the following definition: "A material or substance one or more properties of which are sufficiently well established to be used for the calibration of an apparatus or for the verification of a measurement method." "A certified reference material (CRM) is further defined as: "A RM accompanied by, or traceable to, a certificate stating the property value(s) concerned, issued by an organization, public or private, which is generally accepted as technically competent." A careful reading of this definition will lead the reader to the conclusion that a great many materials will rest comfortably under its umbrella. Thus, for an analytical chemist any pure chemical used to prepare what are usually called "standard solutions" can be considered to be a reference material. Simple devices, such as accurately calibrated optical filters, also are covered by this definition. Where to draw the line to exclude various chemicals or devices is somewhat arbitrary and no hard and fast rules have been developed to date. Weights used to calibrate or check balances are, e.g., not considered reference materials, even though they obviously fit the definition very well. For this reason then the reference materials listed herein are somewhat arbitrary. In fact, the inclusion or exclusion of a particular supplier's reference materials is first and foremost simply a function of whether or not he replied to our inquiry for information.

The current great interest in reference materials as an important means for helping to assure measurement compatibility in a wide variety of applications dates from 1969. In that year the National Bureau of Standards (NBS) and the International Committee on Weights and Measures (CIPM) cosponsored a meeting where the desirability of establishing a formal program internationally was explored. Representatives from 15 countries and 4 international agencies agreed unanimously that such a course of action would be desirable. The need for a central distributing agency for exchange of information on reference materials, preferably through an international agency was stressed. The CIPM was asked to assume this (and other) responsibilities. Subsequently however, the CIPM with regret had to decline due to a lack of resources and a misfit with regard to its scope. (1)

However, the matter was not dead for following the first large scale SRM Symposium held at NBS in 1973 - see reference (2), a meeting called by the International Organization for Legal Metrology was held to reactivate the matter. As a result of this meeting, attended by representatives of 12 countries and 7 international agencies, ISO subsequently agreed to provide secretariat services for international agencies interested in the exchange of information concerning reference materials.

Thus, ISO established REMCO in 1974 to coordinate reference material information exchange activities. Since one of the authors (J. P. Cali) is the U.S.-American National Standards Institute (ANSI) representative on REMCO, this report was prepared to provide information on reference material activity and availability in the U.S. for dissemination in international channels, as well as information of value to U.S. science, technology, and industry directly.

The other author (T. Plebanski) spent one year at NBS under a UNESCO fellowship studying RM's. With this work in place he helped gather, collate, and prepare for publication information on U.S. available reference materials. To this end, NBS contracted with him in 1974 to perform these functions.

## II. Purpose of Guide

All measurement networks need to be compatible. By this we mean that producer and consumer, or regulator and those regulated, need to be able to measure the property(ies) of the same sample in such a way that, within agreed on limits of uncertainty, all obtain identical numerical values of the property(ies) under measurement. Cali, among others, has shown (see 3 or 4 e.g.) that when measurement systems are based on accuracy that measurement compatibility must logically ensue. However, to achieve accuracy in measurement, especially when the property under consideration is that of composition, five basic components of the measuring process need to be available or present (see, e.g., 5). One of these is reference materials and called at NBS for historical reasons Standard Reference Materials (SRM).

Thus, a knowledge of where to obtain reference materials is important. This then is the basic rationale and principal purpose for this guide.

## III. Scope and Structure of Guide

Listed in the body of the report are over 17,000 reference materials. Of these approximately 7,200 fall into

the class "certified reference materials" (see Section IV, below). These 17,000 reference materials are either the direct product of or are distributed by the 93 U.S. companies and/or organizations who responded to the NBS request for information. The information supplied was primarily in the form of catalogues, product lists, etc.

Of the 17,000 reference materials listed, about 2,000 are produced in foreign countries, principally Japan and countries of Europe. There is, of course, considerable duplication among the reference materials. The duplication is especially strong in these classes: high purity elements and inorganic chemicals; spectrochemical mixtures, powders, and alloys; and, standard solutions and mixtures for atomic absorption calibration. We estimate there are listed approximately 10,000 different reference materials produced in the U.S.

No attempt has been made to make a quality assessment of either the producers or of their reference materials.

Two classes of reference materials have been listed: general reference materials (RM) and certified reference materials (CRM). These have been defined above. In attempting to decide whether a particular material was, in fact, suitable for use as a reference material, the general criteria listed by Cali in reference 6 were applied. Some of these criteria are: purity, homogeneity, stability, continuity of both supply and information, availability, and extent of certification process. Other factors considered were: (1) whether the producer states in his literature that his product is suitable for reference purposes (as calibrating material, e.g.); (2) whether the producer guarantees his product in some meaningful way; (3) whether useful technical information is supplied with his product (e.g., actual lot analysis); (4) by comparison of the same product from different sources; and/or, (5) by some evidence that traceability to national or international standards has been established. Thus, it is apparent that a considerable degree of subjective judgment was used by the authors. The ultimate test, of course, as to whether a particular material can serve usefully as a reference material must lie with the user.

The properties embodied in the reference materials are classified in five categories:

1. Chemical composition (Analytical RM) - multicomponent (usually) reference materials, often mixtures or solutions, used in chemical analytical systems. This class will include alloys, mixtures, natural materials, etc.

2. Chemical composition (High Purity RM) - single component (usually) reference materials of high purity used in chemical analytical systems. However, they may also serve for the realization or determination of other properties, e.g., physico-chemical, thermochemical, electrical, etc. Others, e.g., platinum, cesium, krypton serve as primary RM in defining international scales. These latter RM are certified for total purity of the main component and for trace impurities present.
3. Physical properties - reference materials characterized for optical, heat, radiation, etc. properties.
4. Engineering and technological properties - reference materials embodying properties as hardness, smoke density, etc.
5. Biochemical properties - reference materials of botanical, biological, clinical, bionuclear substances.

These categories are not necessarily mutually exclusive. Often RM's will be characterized for more than one property and thus will be found in the appropriate categories. E.g., some bionuclear RM's might be found in category(ies) 1, 3, and 5 if characterized for chemical composition, radioactivity, and biological activity.

Two tables are presented:

Table A: Index of Reference Materials. In this table are incorporated both matrices and properties of interest arranged in the five categories listed above. It would have been impractical to list individually every RM by chemical name or specific material. Therefore, we have tried to use classes or groups to lead the user to a supplier who can provide more specific information with regard to highly specific chemicals, matrices, or properties. In other words, the principal utility of this listing is to provide general guidance to the user to assist in shortening his search time and to make him aware of RM supplies he might otherwise have missed. Only in the catalogs of the various suppliers will be found the specific information usually required for the ultimate end-use.

Table B: Index of Suppliers. In this table we give the names and addresses of the suppliers who replied to our request for information. The addresses shown are those given by the supplier at the time his catalogues were delivered to NBS. Each is given a supplier number, an internal NBS file number, and the approximate number of RM's, either general or certified, produced or distributed.

#### IV. Disclaimer

In issuing this guide NBS makes no warranty, explicit or implied, that any RM listed will perform or not as claimed by the producer or distributor.<sup>†</sup> Neither does NBS, through the inclusion or exclusion of any RM producer or distributor, impute either directly or indirectly the technical, scientific, or economic value or worth of the RM's referenced. This guide is issued by NBS for information only to provide RM users or potential users to RM sources in the U.S. NBS, an agency of the U.S. Government, assumes no liability for damages resulting from the use or misuse of any of the information given in the guide or from use or misuse of the RM's referenced.

#### V. Updating of Guide

It is our intention to update the guide from time to time as interest and demand warrant. RM producers, suppliers, and distributors may send catalogues and pertinent information, together with suggestions to improve the usefulness of the guide to:

J. Paul Cali  
Chief, Office of Standard  
Reference Materials  
Institute for Materials Research  
National Bureau of Standards  
Washington, D.C. 20234.

<sup>†</sup> Excepting RM's and CRM's directly produced by NBS itself (Supplier #86).

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| 1                  | 72/97         | Ace Scientific Supply Co., Inc.<br>1420 East Linden Avenue<br>Linden, N. J. 07036  |           | 16   |
| 2                  | 72/88         | Airco Industrial Gases<br>575 Mountain Avenue<br>Murray Hill, N. J. 07974  | 25        | 143  |
| 3                  | 72/2          | Air Products and Chemicals, Inc.<br>Specialty Gas Department<br>P. O. Box 538<br>Allentown, Pa. 18105                                | 136       | 540  |
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| 7                          | 72/8                  | American Smelting and Refining Company<br>By-Product Sales<br>120 Broadway<br>New York, N. Y. 10005        |                  | 14          |
| 8                          | 72/9                  | Amersham/Searle Corporation<br>2636 S. Clearbrook Drive<br>Arlington Heights, IL 60005                     | 145              | 622         |
| 9                          | 72/126                | Analytical Supplies Development Corp.<br>48 Notch Road<br>Little Falls, N. J. 07424                        | 45               |             |
| 10                         | 72/10                 | Angstrom, Inc.<br>678 E. Huron River Drive<br>P. O. Box 248<br>Belleville, Michigan 48111                  | 16               | 40          |
| 11                         | 72/11                 | Apache Chemicals, Inc.<br>P. O. Box 17<br>Rockford, IL 61105   | 70               | 307         |
| 12                         | 72/12                 | Apex Smelting Company<br>Division of Amax Aluminum Co., Inc.<br>2537 W. Taylor Street<br>Chicago, IL 60612 |                  | 62          |
| 13                         | 72/13                 | Applied Science Laboratories, Inc.<br>P. O. Box 440<br>State College, Pa. 16801                            |                  | 265         |

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| 14                         | 72/14                 | Arro Laboratories, Inc.<br>P. O. Box 686<br>Caton Farm Road<br>Joliet, Ill. 60434  | 45               | 72          |
| 15                         | 72/15                 | Atomergic Chemetals Company<br>Division of Gallard-Schlesinger Mfg. Corp.<br>584 Mineola Avenue, Carle Place<br>Long Island, N. Y. 11514 | 6                | 220         |
| 16                         | 72/78                 | Baird-Atomic, Inc.<br>125 Middlesex Turnpike<br>Bedford, Mass. 01730   | 176              |             |
| 17                         | 72/112                | Baker--See J. T. Baker Company<br><br>Bio-Rad Laboratories<br>32nd and Griffin Avenue<br>Richmond, Calif. 94804                          |                  | 46          |
| 18                         | 72/111                | Bradford Scientific, Inc.<br>P. O. Box 275<br>Marblehead, Mass. 01945  | 15               | 226         |
| 19                         | 72/16                 | Brammer Standard Company<br>213 Essex Knoll Drive<br>Coraopolis, Pa. 15108   | 548              | 613         |
| 20                         | 72/110                | Brinkmann Instruments, Inc.<br>Cantiague Road<br>Westbury, N. Y. 11590   |                  | 5           |

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| 21                         | 72/84                 | Burdick and Jackson Laboratories<br>1953 South Harvey Street<br>Muskegon, Michigan 49442       |                  | 42          |
|                            |                       | Bureau of Mines--See U.S. Dept. of the Interior  |                  |             |
| 22                         | 72/82                 | Calbiochem<br>109 North Torrey Pines Road<br>LaJolla, Calif. 92037                             |                  | 39          |
| 23                         | 72/131&142            | California Bionuclear Corporation<br>7654 San Fernando Road<br>Sun Valley, Calif. 91352        | 463              |             |
| 24                         | 72/17                 | Cannon Instrument Company<br>P. O. Box 16<br>State College, Pa. 16801                          | 29               |             |
|                            |                       | Cargille--See R. P. Cargille   |                  |             |
| 25                         | 72/87                 | Columbia Scientific Industries<br>11950 Jollyville Road<br>P. O. Box 9908<br>Austin, Tx. 78766 | 752              | 30          |
| 26                         | 72/118                | Cominco American, Inc.<br>Building 101<br>Spokane Industrial Park<br>Spokane, Washington 99216 |                  | 19          |

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| 27                 | 72/18         | Continental Oil Company<br>Conostan Division<br>P. O. Box 1267<br>Ponca City, Oklahoma 74601         | 52    | 1                  |      |
| 28                 | 72/90         | Duke Scientific Corporation<br>445 Sherman Avenue<br>Palo Alto, Calif. 94306                         | 33    | 65                 |      |
| 29                 | 72/19         | Eastman Kodak Company<br>Eastman Organic Chemicals<br>Rochester, N. Y. 14650                         | 6     | 235                |      |
| 30                 | 72/21         | Electronic Space Products, Inc.<br>854 S. Robertson Blvd.<br>Los Angeles, Calif. 90035               | 240   | 1128               |      |
| 31                 | 72/109        | EM Laboratories, Inc.<br>500 Executive Boulevard<br>Elmsford, N. Y. 10523                            |       | 10                 |      |
| 32                 | 72/23         | ESCO Corporation<br>2141 N.W. 25th Ave.<br>Portland, Oregon 97210                                    | 1     | 62                 |      |
| 33                 | 72/24         | Fisher--See Jarrel-Ash Division<br><br>F&J Scientific<br>79 Far Horizon Drive<br>Monroe, Conn. 06468 |       |                    | 230  |

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| 34                         | 72/25                 | Footo Mineral Company<br>Route 100<br>Exton, Pa. 19341  | 1                | 8           |
|                            |                       | Frederick Smith--See G. Frederick Smith   |                  |             |
| 35                         | 72/26                 | Gallard Schlesinger Chemical Manufacturing<br>Corporation<br>584 Mineola Avenue<br>Carle Place, N. Y. 11514 |                  | 91          |
| 36                         | 72/81                 | General Graphites, Inc.<br>First and Monroe Streets<br>Bay City, Michigan 48706                             | 53               | 7           |
| 37                         | 72/28                 | G. Frederick Smith Chemical Company<br>P. O. Box 23344<br>Columbus, Ohio 43223                              | 68               | 17          |
| 38                         | 72/29                 | Glidden-Durkee<br>Division of SCM Corporation<br>Metals Group<br>P. O. Box 217<br>Johnstown, Pa. 15907      | 1                |             |
| 39                         | 72/30                 | Handy & Harman<br>Fairfield Plant<br>1770 Kings Hwy.<br>Fairfield, Conn. 06430                              | 2                |             |

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| 40                 | 72/32         | Harshaw--See the Harshaw Chemical Company<br>Huntington Alloys, Inc.<br>Huntington, West Virginia 25720   | 32        |      |
| 41                 | 72/114        | ICN Life Sciences Group<br>26201 Miles Road<br>Cleveland, Ohio 44128  | 114       | 461  |
| 42                 | 72/92         | Janos Optical Corporation<br>Route 35<br>Townshend, Vermont 05353   |           | 276  |
| 43                 | 72/35         | Jarrel-Ash Division, Fisher Scientific<br>Company<br>Spectrographic Supplies Section<br>590 Lincoln Street<br>Route 128<br>Waltham, Mass. 02154 | 225       | 23   |
| 44                 | 72/37         | J. T. Baker Chemical Company<br>222 Red School Lane<br>Phillipsburg, N. J. 08865  | 130       | 818  |
| 45                 | 72/105        | Kawecki Berylco Industries, Inc.<br>220 East 42nd Street<br>New York, N. Y. 10017   |           | 8    |

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| 46                         | 72/117                | Lachat Chemicals, Inc.<br>1350 W. Meguon Road<br>Meguon, Wisconsin 53092              |                  | 44          |
| 47                         | 72/80                 | LaPine Scientific Company<br>6001 South Knox Avenue<br>Chicago, Ill. 60629            |                  | 57          |
| 48                         | 72/95                 | Leco Corporation<br>3000 Lakeview Avenue<br>St. Joseph, Michigan 49085                | 137              | 30          |
|                            |                       | Linde--See Union Carbide Corporation, Linde<br>Division                               |                  |             |
|                            |                       | London Company--See The London Company  |                  |             |
| 49                         | 72/43                 | Materials Research Corporation<br>Orangeburg, N. Y. 10962                             | 56               | 160         |
| 50                         | 72/100                | Metals Research Instrument Corporation<br>40 Robert Pitt Drive<br>Monsey, N. Y. 10952 | 83               | 71          |
| 51                         | 72/128                | Miles Laboratories, Inc.<br>Research Division<br>Elkhart, Indiana 46514               | 20               | 31          |

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|                    |               | Mineral--See U.S. Mineral and Chemical Co.   |           |      |
| 52                 | 72/45         | Monsanto Company<br>800 N. Lindbergh Blvd.<br>St. Louis, Missouri 63166                                    |           | 3    |
| 53                 | 72/47         | Nanogens--Analytical Specialists<br>P. O. Box 1025<br>Watsonville, Calif. 95076                            |           | 171  |
|                    |               | National Bureau of Standards--See U.S.<br>Department of Commerce   |           |      |
| 54                 | 72/49         | National Spectrographic Laboratories, Inc.<br>19500 South Miles Road<br>Cleveland, Ohio 44128              | 109       |      |
|                    |               | New Brunswick Laboratory--See United States<br>Department of Energy  |           |      |
| 55                 | 72/51         | New England Nuclear Corporation<br>549 Albany Street<br>Boston, Mass. 02118                                | 121       | 168  |
| 56                 | 72/98-46      | NL Industries, Inc.<br>Spectrographic Laboratory<br>2700 South Indiana Street<br>Los Angeles, Calif. 90023 | 59        |      |

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| 57                         | 72/123                | Norell Chemical Company, Inc.<br>Arbor Ave. and Clara St.<br>Landisville, N. J. 08326   |                  | 18          |
| 58                         | 72/129                | Nuclepore Corporation<br>7035 Commerce Circle<br>Pleasanton, Calif. 94566               |                  | 39          |
|                            |                       | Nucor Corporation--See Research Chemicals,<br>Div. of Nucor Corp.                       |                  |             |
| 59                         | 72/91                 | Ortec, Inc.<br>100 Midland Road<br>Oak Ridge, Tenn. 37830                               | 2                |             |
| 60                         | 72/96                 | Pfaltz & Bauer, Inc.<br>375 Fairfield Avenue<br>Stamford, Conn. 06902                   | 31               | 121         |
| 61                         | 72/52                 | Phillips Petroleum Company<br>Special Products Division<br>Bartlesville, Oklahoma 74004 | 124              | 24          |
| 62                         | 72/86                 | Polyscience Corporation<br>6366 Gross Point Road<br>Niles, Illinois 60648               | 16               | 34          |

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| 63                         | 72/119                | Research Chemicals<br>Division of Nucor Corp.<br>P. O. Box 14588<br>Phoenix, Arizona 85063    |                  | 32          |
| 64                         | 72/99                 | Research Organic/Inorganic Chemical Corp.<br>11686 Sheldon Street<br>Sun Valley, Calif. 91352 | 148              | 140         |
| 65                         | 72/54                 | R. P. Cargille Laboratories, Inc.<br>Cargille Scientific Inc.<br>Cedar Grove, N. J. 07009     |                  | 251         |
| 66                         | 72/134                | Rutherford Research Products Company<br>Box 249<br>Rutherford, N. J. 07070                    | 8                |             |
| 67                         | 72/55                 | Sawyer Research Products, Inc.<br>35400 Lakeland Boulevard<br>Eastlake, Ohio 44094            | 24               |             |
| 68                         | 72/56                 | Scientific Gas Products, Inc.<br>513 Raritan Center<br>Edison, N. J. 08817                    | 24+              | numerous    |

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| 69                         | 72/57                 | Sensorex<br>17502 Armstrong Ave.<br>Irvine, Calif. 92705  |                  | 46          |
| 70                         | 72/135                | Service Physical Testers<br>Division of Service Diamond Tool Co.<br>6169 Lakeshore Road<br>Port Huron, Michigan 18060 | 1+<br>numerous   |             |
| 71                         | 72/121                | Sigmund Cohn Corporation<br>121 So. Columbus Ave.<br>Mount Vernon, N. Y. 10553  |                  | 2           |
| 72                         | 72/58                 | Smith and Underwood Laboratories<br>1023 Troy Court<br>Troy, Michigan 48084   |                  | 55          |
| 73                         | 72/59                 | Spex Industries, Inc.<br>3880 Park Avenue<br>Metuchen, N. J. 08840  | 145              | 299         |
| 74                         | 72/60                 | Supelco, Inc.<br>Supelco Park<br>Bellefonte, Pa. 16823  |                  | 73          |

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| 75                 | 72/62         | Texas Instruments, Inc.<br>Research Building<br>13500 North Central Expressway<br>Dallas, Texas 75222                 | 1         |      |
| 76                 | 72/31         | The Harshaw Chemical Company<br>Crystal and Electronic Products Development<br>6801 Cochran Road<br>Solon, Ohio 44139 | 51        | 11   |
| 77                 | 72/65         | The London Company<br>811 Sharon Drive<br>Cleveland, Ohio 44145   | 2         | 14   |
| 78                 | 72/85         | Tousimis Research Corporation<br>P. O. Box 2189<br>Rockville, Md. 20852   | 12        | 20   |
| 79                 | 72/108        | Twin City Testing Corporation<br>107-111 Goundry Street<br>N. Tonawanda, N. Y. 14120                                  |           |      |
| 80                 | 72/66         | Ultra Carbon Corporation<br>First and North Madison Streets<br>Bay City, Michigan 48706                               | 12        | 154  |

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| 81                 | 72/94         | Union Carbide Corporation<br>Carbon Products Division<br>270 Park Avenue<br>New York, N. Y. 10017                                 | 76        | 13   |
| 82                 | 72/67         | Union Carbide Corporation<br>Chemicals & Plastics<br>P. O. Box 8361<br>South Charleston, W. Va. 25303                             | 2         | 2    |
| 83                 | 72/115        | Union Carbide Corporation<br>Linde Division<br>P. O. Box 372<br>51 Cragwood Road<br>South Plainfield, N. J. 07080                 |           | 12   |
| 84                 | 72/68         | Union Carbide Corporation<br>Nuclear Division<br>P. O. Box P<br>Oak Ridge, Tenn. 37830  |           | 135  |
| 85                 | 72/70         | U. S. Department of Energy<br>New Brunswick Laboratory<br>P. O. Box 150<br>New Brunswick, N. J. 08903                             | 20        |      |
| 86                 | 72/76         | U. S. Department of Commerce<br>National Bureau of Standards<br>Office of Standard Reference Materials<br>Washington, D. C. 20234 | 904       | 17   |

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| 87                         | 72/132                | U. S. Department of the Interior<br>Bureau of Mines, Branch of Engineering<br>Box H 4372<br>Herring Plaza<br>Amarillo, Texas 79101 | 2            | 3                         |
| 88                         | 72/69                 | U. S. Mineral and Chemical Corporation<br>129 Hudson Street<br>New York, N. Y. 10013   | 251          |                           |
| 89                         | 72/79                 | U. S. Steel Corporation<br>600 Grant Street<br>Pittsburgh, Pa. 15230   | 35           |                           |
| 90                         | 72/127                | Var-Lac-Oid Chemical Company<br>666 South Front Street<br>Elizabeth, N. J. 07202   |              | 59                        |
| 91                         | 72/74                 | Ventron Corporation<br>Alfa Products<br>152 Andover Street<br>Danver, Mass. 01923  | 232          | 236                       |

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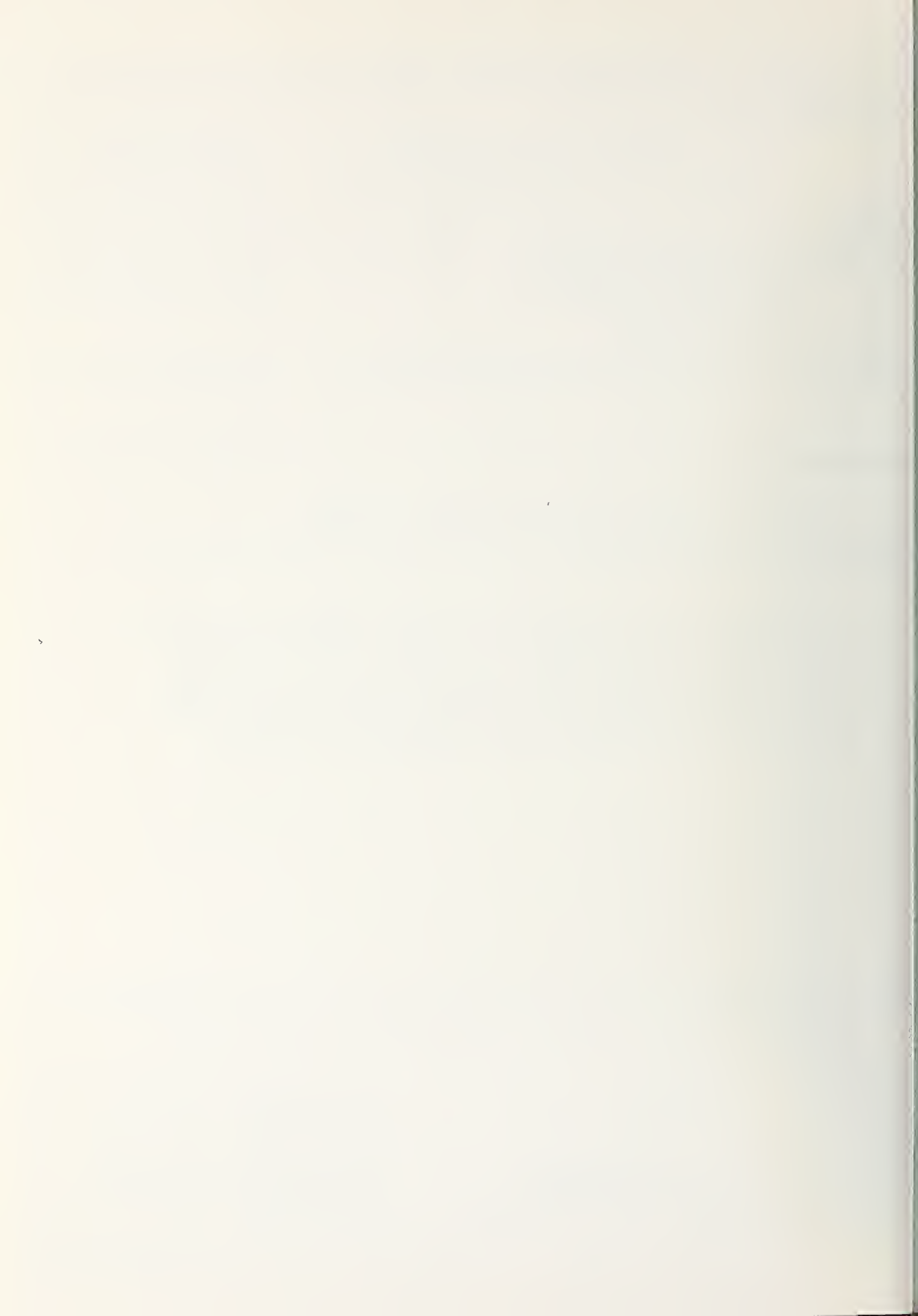
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| 92                         | 72/124                | Westinghouse Electric Corporation<br>Electronic Tube Division<br>P. O. Box 284<br>Elmira, N. Y. 14902 | 140              | 360         |
| 93                         | 72/83                 | Wilks Scientific Corporation<br>P. O. Box 449<br>So. Norwalk, Conn. 06856                             | —                | <u>109</u>  |

## REFERENCES

- (1) Astin, A. V., Report on the Symposium on an International Standard Reference Materials Program, *Metrologia*, 6, 33 (1970).
- (2) Seward, R. W. (ed.), Standard Reference Materials and Meaningful Measurements, *NBS Spec. Publ.* 408 (1975).
- (3) Cali, J. P. and Stanley, C. L., Measurement Compatibility and Standard Reference Materials, *Ann. Rev. Mat'l. Sci.*, 5, 329 (1975).
- (4) Cali, J. P., The NBS Standard Reference Materials Program: An Update, *Anal. Chem.*, 48, 802A (1976).
- (5) Cali, J. P., et al., The Role of Standard Reference Materials in Measurement Systems, *NBS Monograph* 148 (1975).
- (6) Cali, J. P., International Criteria for Reference Materials, from Quality Control in Clinical Chemistry, Walter de Gruyter, New York (1975).

# NOTES

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